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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/606,104	06/25/2003	Tzu-Yu Wang	H0004823 (1139.1140101)	4209

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EXAMINER	
NGUYEN, PHILLIP	
ART UNIT	**PAPER NUMBER**
2828	

DATE MAILED: 05/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/606,104	WANG ET AL.	
	Examiner	Art Unit	
	Phillip Nguyen	2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 March 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-36 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-17 and 23-30 and are rejected under 35 U.S.C. 103(a) as being anticipated by Jewell ('891).

With respect to claim 1, Jewell discloses in Figures 5D-5F and 7 a vertical cavity surface emitting laser comprising a substrate 82; a first mirror 118 situated on said substrate; an active region 86 situated on said first mirror; a second mirror 122 situated on said active region; a first electrical contact 128 situated on said first mirror; and wherein said first mirror comprises a plurality of pairs of layers 119 and 120; and one layer 119 of at least one pair of the plurality of pair layers is an oxidized layer; wherein said one layer has an aluminum content of less than 60% before being oxidized. It is noted that Jewell discloses the aluminum content in the oxidized

layer is at least 60%. However, the claimed content of aluminum is very close to that of the prior art. According to the Titanium Metals Corp. of America v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985), where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. Therefore, it is obvious that even the range is not overlapped, the laser would be expected to produce the same result.

With respect to claim 2, Jewell discloses the substrate comprising InP (col. 7, lines 2-4).

With respect to claims 3 and 4, Jewell discloses the oxidized layer comprising at least one of a group comprising oxidized InAlAs, InA1GaAs, Alas, AlGaAsSb, AlGaPSb and AlPSb and one layer of least one pair of the plurality of pairs of layers comprises InP (col. 7, lines 4-9).

With respect to claims 5-7, Jewell discloses said second mirror comprises a plurality of pairs of layers 123 and 124; and one layer of at least one pair of the plurality of pairs of layers of said second mirror comprises InP and one of a group comprising InGaAsP, InA1As, InAIGaAs, Alas, AlGaAsSb, AIGaPSb and AlPSb (col. 7, lines 4-9). It is noted that Jewell discloses InGaAsP and which includes InP.

With respect to claims 8 and 10, Jewell discloses a vertical cavity surface emitting laser comprising first mirror 118; cavity proximate to said first mirror; and a second mirror 122 proximate to wherein said cavity and said first mirror comprises a plurality of layers; and the plurality of layers comprises at least one pair of layers having an InP layer and an oxidized layer (col. 7, lines 4-9). It is noted that the cavity is form by first and second mirrors.

With respect to claim 9, Jewell discloses the substrate comprising InP (col. 7, lines 2-4).

With respect to claim 11, Jewell discloses the claim invention as shown in the rejection of claims 5-7.

With respect to claim 12, Jewell discloses an active layer 86 including at least one quantum well.

With respect to claim 13, Jewell discloses said second mirror comprising a partially oxidized layer for confining current because the second mirror includes a plurality of oxidized and non-oxidized layers alternating each other.

With respect to claim 14, Jewell discloses a first electrical contact 96 on said second mirror; and a second electrical contact 98 on the substrate.

With respect to claim 15, Jewell discloses an intra-cavity contact layer 146 situated between said first mirror and said cavity; first contact 96 on said second mirror; and second contact 128 on said intra-cavity contact layer.

With respect to claims 16-17, Jewell discloses in Figures 5D-5F and 7 a vertical cavity surface emitting laser comprising a substrate 82 comprising InP (col. 7, lines 2-4); a first stack of layers 118 formed on said substrate; a quantum well region 86 formed on said first stack of layers; a second stack of layers 122 formed on said quantum well region; wherein approximately every other layer of said first stack of layers is at least partially oxidized. Jewell further discloses every other layer comprising InP (col. 7, lines 4-9).

4. Claims 18-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jewell et al. ('891) in view of Kim et al. ('964). Jewell discloses the claimed invention except for the thickness of the first and second stacks of DBR layers. Kim discloses the claimed invention with VCSEL having a substrate made of InP; a first and second stacks of layers, a quantum well

region except for every other layer of said first stack of layers is partially oxidized as taught by Jewell. However Kim further discloses each of the first and second stacks of DBR layers has a thickness of approximately ¼ of an optical wavelength between 1200-1800nm (*col. 4, lines 7-28).*. For the improvement of the VCSEL, it would have been obvious to the one having ordinary skill in the art at the time the invention was made to explicitly provide the thickness of the first and second stacks of mirrors with equivalent output wavelength as taught by Kim because it is well known in the art to have such thickness. Jewell further provides the every other layer being partially oxidized is formed from a material consisting in a group of InGaAsP, InAlAs, etc. as shown in the rejection of claims 3-4. Jewell also teaches that the partially oxidized layers are for confining current (col. 9, lines 49-51).

Claims 23-30 further disclose a method for making a VCSEL. Since Jewell and Kim disclose the product, it is inherent product by process for performing the method as recited in the claims.

5. Claims 31-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jewell ('891) in view Feld et al. ('357).

With respect to claims 31 and 35-36, Jewell discloses in Figures 5D-5F and 7 a vertical cavity surface emitting laser comprising a first mirror 118 having a plurality of pairs of layers, wherein one layer of each pair of layers is an oxidized layer; a cavity proximate to said first mirror; and a second mirror 122 proximate to said cavity. However, Jewell does not disclose the number of pairs of layers being six or less. Feld discloses in Fig. 3 a VCSEL with a first mirror 33 and second mirror 32 defining a cavity. Field does not explicitly disclose one layer of each

pair being an oxidized layer. For the improvement of the VCSEL, it would have been obvious to the one having ordinary skill in the art at the time the invention was made to provide the number of layers of the first mirror as few as six or less as taught by Feld because changing the number of mirror layers only affects the reflectivity of the mirror. In this case, it is such a design choice.

With respect to claim 32, see the rejection of claim 1.

With respect to claim 33, see the rejection of claims 5-7.

With respect to claim 34, see the rejection of claim 3.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Citation of Pertinent References

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The patent to Jewell discloses CONDUCTIVE ELEMENT WITH LATERAL OXIDATION BARRIER, U.S. Patent No. 5719891

The patent to Kim discloses MOISTURE PASSIVATED PLANAR INDEX-GUIDED VCSEL, U.S. Patent No. 6680964

The patent to Feld et al. discloses MICROCAVITY SURFACE EMITTING LASERS, U.S. Patent No. 6266357

Communication Information

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phillip Nguyen whose telephone number is 571-272-1947. The examiner can normally be reached on 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MINSUN HARVEY, can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MINSUN CH HARVEY
PRIMARY EXAMINER